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09/694,870	10/24/2000	Dan M. Griffin	907.0009USU	2361

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EXAMINER

MATTIS, JASON E

ART UNIT	PAPER NUMBER
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2616

DATE MAILED: 10/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 09/694,870	Applicant(s) GRIFFIN ET AL.	
	Examiner Jason E. Mattis	Art Unit 2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-6, 8-16 and 18-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-6, 8-16, and 18-19 is/are rejected.
- 7) ☒ Claim(s) 20-23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the Amendment filed 7/10/06. New claims 20-23 have been added. Claims 2-6, 8-16 and 18-23 are currently pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2-6, 12, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schilling (U.S. Pat. 6269092) in view of Turlington et al. (U.S. Pat. 5940031) and Agarwal et al. (U.S. Pat. 6529485 B1).

With respect to claim 2, Schilling discloses a method to operate a communication device (**See the abstract of schilling for reference to a method of operating a remote station, which is a communication device**). Schilling also discloses during a receive period, receiving a first carrier and deriving a receiver tracking signal that is indicative of a frequency shift between the received first carrier and a reference signal (**See column 6 line 64 to column 7 line 13 and Figure 4 of**

Schilling for reference to during a receive period, receiving a BS-channel-sounding signal, at a frequency f_2 , which is a first carrier, and deriving from the BS-channel-sounding signal a frequency representation or shift of the signal from a reference). Schilling further discloses shifting a receiver baseband signal by an amount and in a direction indicated by the receiver tracking signal **(See column 7 lines 14-38 and Figure 4 of Schilling for reference to a frequency-adjust circuit 34 providing the frequency shift to a spread-spectrum receiver 31 to adjust the frequency of the spread-spectrum receiver, meaning the signal is shifted by an amount and in a direction to compensate for the frequency shift).** Schilling also discloses during a next transmission period, shifting a transmitter baseband signal by an amount indicated by the receiver tracking signal and in a direction opposite to the direction indicated by the receiver tracking signal during the receive period **(See column 7 line 61 to column 8 line 5 and Figure 5 of Schilling for reference to signal source 39 shifting a transmitter signal frequency in the opposite direction of the received signal frequency shift as indicated by the frequency-adjust circuit 34).** Schilling further discloses transmitting a second carrier signal that is modulated in accordance with the shifted baseband signal **(See column 7 line 61 to column 8 line 5 and Figure 5 of Schilling for reference to transmitting a signal using antenna 41).** Schilling does not disclose that the shifting comprises time multiplexing a digital phase shifter circuit between a receiver baseband subsystem and a transmitter baseband subsystem. Schilling also does not disclose deriving the receiver tracking signal from an accumulated plurality of outputs for a carrier loop tracking circuit.

With respect to claim 12, Schilling discloses a time division duplex code division multiple access communication system comprising a plurality of customer premises equipment and an access point that communicate through RF links with the CPE comprising a receiver baseband subsystem and transmitter baseband subsystem **(See column 5 lines 38-58, column 6 line 43 to column 8 line 5 and Figures 2, 4, and 5 of Schilling for reference to a TDD CDMA communication system including a plurality of remote stations 11, which are customer premises equipment, and a base station 12, which is an access point, that wirelessly communicate with one another with the remote station 11 comprising a receiver baseband subsystem, as shown in Figure 4, and a transmitter baseband subsystem, as shown in Figure 5)**. Schilling also discloses receiver circuitry operable during a receive period for receiving an RF carrier from the AP for deriving a receiver tracking signal that is indicative of an error between the received carrier and a reference signal **(See column 6 line 64 to column 7 line 13 and Figure 4 of Schilling for reference to during a receive period, receiving a BS-channel-sounding signal, at a frequency f_2 , which is a first carrier, and deriving from the BS-channel-sounding signal a frequency representation or shift of the signal from a reference)**. Schilling further discloses a digital phase shifter for correcting the frequency and phase of a receiver baseband signal by an amount and in a direction indicated by the receiver tracking signal **(See column 7 lines 14-38 and Figure 4 of Schilling for reference to a frequency-adjust circuit 34 providing the frequency shift to a spread-spectrum receiver 31 to adjust the frequency of the spread-spectrum receiver, meaning the signal is shifted by**

an amount and in a direction to compensate for the frequency shift). Schilling also discloses a transmitter circuitry operable during a next transmission period for operating the digital phase shifter to vary the frequency of a transmitter baseband signal by an amount and in a direction opposite to the direction indicated by the receiver tracking signal for pre-compensating a transmitted carrier that is transmitted to the AP **(See column 7 line 61 to column 8 line 5 and Figure 5 of Schilling for reference to signal source 39 shifting a transmitter signal frequency in the opposite direction of the received signal frequency shift as indicated by the frequency-adjust circuit 34, thereby pre-compensating a signal that is transmitted to the base station 12).**

Schilling does not disclose multiplexing circuitry for sharing the digital phase shifter between the receiver baseband subsystem and the transmitter band subsystem.

Schilling also does not disclose deriving the receiver tracking signal from an accumulated plurality of outputs for a carrier loop tracking circuit.

With respect to claims 2 and 12, Turlington et al., in the field of communications disclose time multiplexing a digital phase shifter circuit between a receiver baseband subsystem and a transmitter baseband subsystem **(See column 4 line 66 to column 5 line 17 and Figure 6 of Turlington et al. for reference to a transmitter receiver module sharing its phase shift control functions by using a single pole double throw RF switch 32 to time multiplex phase shifter 134 between the receiver subsystem and the transmitter subsystem).** Time multiplexing a digital phase shifter circuit between a receiver baseband subsystem and a transmitter baseband subsystem has the advantage of allowing a simpler and less

costly circuitry design to be implemented in a transceiver since only one set of phase shifting circuitry is needed rather than separate phase shifting circuitry for both the receiver and transmitter.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Turlington et al., to combine time multiplexing a digital phase shifter circuit between a receiver baseband subsystem and a transmitter baseband subsystem, as suggested by Turlington et al., with the system and method of Schilling, with the motivation being to allow a simpler and less costly circuitry design to be implemented in a transceiver since only one set of phase shifting circuitry is needed rather than separate phase shifting circuitry for both the receiver and transmitter.

With respect to claims 2 and 12, Agarwal et al., in the field of communications, discloses deriving a receiver tracking signal from an accumulated plurality of outputs for a carrier loop tracking circuit **(See column 9 line 23 to column 10 line 54 and claim 2 of Agarwal et al. for reference to accumulating timing corrections on both a transmitter and receiver side and for reference to using the accumulated corrections to adjust a clock frequency to correct for Doppler frequency shift effects)**. Deriving a receiver tracking signal from an accumulated plurality of outputs for a carrier loop tracking circuit has the advantage of allowing smoother control of frequency corrections by adjusting for frequency shifts over a period of time.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Agarwal et al., to combine deriving a

receiver tracking signal from an accumulated plurality of outputs for a carrier loop tracking circuit, as suggested by Agarwal et al. with the system and method of Schilling and Turlington et al., with the motivation being to allow smoother control of frequency corrections by adjusting for frequency shifts over a period of time.

With respect to claim 3, Schilling discloses that the carriers convey CDMA communication signals **(See column 3 lines 32-42 of Schilling for reference to using CDMA signaling)**.

With respect to claim 4, Schilling discloses that a TDD communication device comprises customer premises equipment and that a first carrier is received from a transmitter of an access point **(See column 5 lines 38-58, column 8 lines 31-45, and Figure 2 of Schilling for reference to a remote station 11, which is a TDD CPE device, receiving signals from base station 12, which is an access point)**.

With respect to claims 5 and 16, Schilling discloses that the receiver tracking signal is stored and inverted for use during the next transmission period **(See column 6 line 43 to column 8 line 5 and Figures 4-5 of Schilling for reference to receiving the BS-channel-sounding signal and storing it to be processed to determine a phase shift that is used both in receiving signals and transmitting signals with the shift used for the transmitting signals being inverted with respect to the shift used for the receiving signals)**.

With respect to claim 6, Schilling discloses that the shifting of the transmitter signal functions to pre-compensate the transmitted second signal to reduce carrier acquisition time at a receiver of the second signal **(See column 7 line 61 to column 8**

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line 5 and Figure 5 of Schilling for reference to pre-compensating a transmitted signal by shifting its frequency to reduce carrier acquisition time at a receiver).

4. Claims 8-11, 13-15, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schilling in view of Turlington et al. and Agarwal et al. as applied to claims 2-6, 12, and 16 above, and in further view of Bainton et al. (U.S. Pat. 6064241).

With respect to claim 8, Schilling discloses a communication device comprising a receiver baseband subsystem and a transmitter baseband subsystem **(See column 5 lines 38-58, column 6 line 43 to column 8 line 5 and Figures 2, 4, and 5 of Schilling for reference to a remote station 11, which is a communication device, comprising a receiver baseband subsystem, as shown in Figure 4, and a transmitter baseband subsystem, as shown in Figure 5)**. Schilling also discloses a receiver comprising circuitry that is operable during a receive period for receiving a carrier and for deriving a receiver tracking signal that is indicative of a frequency and phase shift between the received carrier and a reference signal **(See column 6 line 64 to column 7 line 13 and Figure 4 of Schilling for reference to during a receive period, receiving a BS-channel-sounding signal, at a frequency f_2 , which is a first carrier, and deriving from the BS-channel-sounding signal a frequency representation or shift of the signal from a reference)**. Schilling further discloses the receiver also comprising shifting circuitry for rotating the frequency and phase of a receiver baseband signal by an amount and in a direction indicated by the receiver tracking signal **(See column 7 lines 14-38 and Figure 4 of Schilling for reference to**

a frequency-adjust circuit 34 providing the frequency shift to a spread-spectrum receiver 31 to adjust the frequency of the spread-spectrum receiver, meaning the signal is shifted by an amount and in a direction to compensate for the frequency shift). Schilling also discloses a transmitter comprising shifting circuitry that is operable during a next transmission period for generating a frequency for a transmitter baseband signal that is shifted by an amount indicated by the receiver tracking signal and in a direction opposite to the direction indicated by the receiver tracking signal **(See column 7 line 61 to column 8 line 5 and Figure 5 of Schilling for reference to signal source 39 shifting a transmitter signal frequency in the opposite direction of the received signal frequency shift as indicated by the frequency-adjust circuit 34).** Schilling does not disclose that the shifting circuitry of the transmitter and the receiver comprises a frequency to phase accumulator circuit. Schilling also does not disclose circuitry for time multiplexing the shifting circuitry between the receiver baseband subsystem and the transmitter baseband subsystem. Schilling further does not disclose deriving the receiver tracking signal from an accumulated plurality of outputs for a carrier loop tracking circuit.

With respect to claim 14, Schilling et al. does not disclose a frequency to phase accumulator having an input coupled to receiver the receiver tracking signal and an output coupled to a control input of the digital phase shifter. Bainton et al. also does not disclose multiplexing circuitry sharing the shifting circuitry between the receiver baseband subsystem and the transmitter baseband subsystem.

With respect to claim 18, Schilling discloses a time division duplex code division multiple access communication system comprising a plurality of customer premises equipment and an access point that wirelessly communicate with one another with a CPE comprising receiver baseband means and transmitter baseband means **(See column 5 lines 38-58, column 6 line 43 to column 8 line 5 and Figures 2, 4, and 5 of Schilling for reference to a TDD CDMA communication system including a plurality of remote stations 11, which are customer premises equipment, and a base station 12, which is an access point, that wirelessly communicate with one another with the remote station 11 comprising a receiver baseband subsystem, as shown in Figure 4, and a transmitter baseband subsystem, as shown in Figure 5)**. Schilling also discloses a means operable during a receive period of a carrier from the AP for deriving a receiver tracking signal that is indicative of an error between the received carrier and a reference signal **(See column 6 line 64 to column 7 line 13 and Figure 4 of Schilling for reference to during a receive period, receiving a BS-channel-sounding signal, at a frequency f_2 , which is a first carrier, and deriving from the BS-channel-sounding signal a frequency representation or shift of the signal from a reference)**. Schilling further discloses a means for correcting the frequency and phase of a receiver baseband signal by an amount and in a direction indicated by the receiver tracking signal **(See column 7 lines 14-38 and Figure 4 of Schilling for reference to a frequency-adjust circuit 34 providing the frequency shift to a spread-spectrum receiver 31 to adjust the frequency of the spread-spectrum receiver, meaning the signal is shifted by an amount and in a direction**

to compensate for the frequency shift). Schilling also discloses a means operable during a next transmission period for operating the correcting means to vary the frequency of a transmitter baseband signal by an amount and in a direction opposite to the direction indicated by the receiver tracking signal for pre-compensating a transmitted carrier that is transmitted to the AP **(See column 7 line 61 to column 8 line 5 and Figure 5 of Schilling for reference to signal source 39 shifting a transmitter signal frequency in the opposite direction of the received signal frequency shift as indicated by the frequency-adjust circuit 34, thereby pre-compensating a signal that is transmitted to the base station 12).** Schilling does not disclose a frequency to phase accumulator means having an input coupled to receiver the receiver tracking signal and an output coupled to a control input of the correcting means. Schilling also does not disclose a sharing means sharing the correcting means and frequency to phase accumulator means between the receiver baseband means and the transmitter baseband means. Schilling further does not disclose deriving the receiver tracking signal from an accumulated plurality of outputs for a carrier loop tracking circuit.

With respect to claims 8, 14, and 18, Turlington et al., in the field of communications disclose time multiplexing a digital phase shifter circuit between a receiver baseband subsystem and a transmitter baseband subsystem **(See column 4 line 66 to column 5 line 17 and Figure 6 of Turlington et al. for reference to a transmitter receiver module sharing its phase shift control functions by using a single pole double throw RF switch 32 to time multiplex phase shifter 134 between the receiver subsystem and the transmitter subsystem).** Time

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multiplexing a digital phase shifter circuit between a receiver baseband subsystem and a transmitter baseband subsystem has the advantage of allowing a simpler and less costly circuitry design to be implemented in a transceiver since only one set of phase shifting circuitry is needed rather than separate phase shifting circuitry for both the receiver and transmitter.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Turlington et al., to combine time multiplexing a digital phase shifter circuit between a receiver baseband subsystem and a transmitter baseband subsystem, as suggested by Turlington et al., with the system and method of Schilling, with the motivation being to allow a simpler and less costly circuitry design to be implemented in a transceiver since only one set of phase shifting circuitry is needed rather than separate phase shifting circuitry for both the receiver and transmitter.

With respect to claims 8 and 18, Agarwal et al., in the field of communications, discloses deriving a receiver tracking signal from an accumulated plurality of outputs for a carrier loop tracking circuit **(See column 9 line 23 to column 10 line 54 and claim 2 of Agarwal et al. for reference to accumulating timing corrections on both a transmitter and receiver side and for reference to using the accumulated corrections to adjust a clock frequency to correct for Doppler frequency shift effects)**. Deriving a receiver tracking signal from an accumulated plurality of outputs for a carrier loop tracking circuit has the advantage of allowing smoother control of frequency corrections by adjusting for frequency shifts over a period of time.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Agarwal et al., to combine deriving a receiver tracking signal from an accumulated plurality of outputs for a carrier loop tracking circuit, as suggested by Agarwal et al. with the system and method of Schilling and Turlington et al., with the motivation being to allow smoother control of frequency corrections by adjusting for frequency shifts over a period of time

With respect to claim 13, Schilling et al. does not disclose a frequency to phase accumulator having an input coupled to receiver the receiver tracking signal and an output coupled to a control input of the digital phase shifter.

With respect to claims 8, 13-14, and 18, Bainton et al., in the field of communications discloses shifting circuitry that comprises a frequency to phase accumulator circuit **(See column 1 line 51 to column 2 line 5 of Bainton et al. for reference to shifting circuitry comprising a phase accumulator, which is a frequency to phase accumulator circuit, having an input coupled to a reference clock signal and an output coupled to a phase shifter control circuit)**. Using shifting circuitry that comprises a frequency to phase accumulator circuit has the advantage using a simple and widely known method of determining a phase shift error of a signal.

It would have been obvious for one of ordinary skill in the art at the time of the invention, when presented with the work of Bainton et al., to combine shifting circuitry that comprises a frequency to phase accumulator circuit, as suggested by Bainton et al. with the system and method of Schilling, Turlington et al., and Agarwal et al., with the

motivation being to use a simple and widely known method of determining a phase shift error of a signal.

With respect to claim 9, Schilling discloses that the carriers convey CDMA communication signals **(See column 3 lines 32-42 of Schilling for reference to using CDMA signaling)**.

With respect to claim 10, Schilling discloses that a TDD communication device comprises customer premises equipment and that a first carrier is received from a transmitter of an access point **(See column 5 lines 38-58, column 8 lines 31-45, and Figure 2 of Schilling for reference to a remote station 11, which is a TDD CPE device, receiving signals from base station 12, which is an access point)**.

With respect to claims 11, 15, and 19, Schilling discloses that the receiver tracking signal is stored for use during the next transmission period **(See column 6 line 43 to column 8 line 5 and Figures 4-5 of Schilling for reference to receiving the BS-channel-sounding signal and storing it to be processed to determine a phase shift that is used both in receiving signals and transmitting signals)**.

Allowable Subject Matter

5. Claims 20-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

Claims 20-23 would be allowable since the prior art of record fails to disclose or render obvious the receiver tracking signal formula in each of these claims.

Response to Arguments

7. Applicant's arguments with respect to claims 2-6, 8-16, and 18-23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason E. Mattis whose telephone number is (571) 272-3154. The examiner can normally be reached on M-F 8AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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